IN THE CLAIMS

1. (currently amended) An apparatus for determining a property of a fluid downhole comprising:

a resonator associated with the fluid downhole;

a controller ~~for actuating~~ which actuates the resonator;

~~a moniter for receiving a response from the resonator to the actuation of the resonator such that the response is associated with the fluid~~; and

a processor ~~for estimating~~ which estimates the property for the fluid downhole using a response of the resonator to the actuation.

2. (previously presented) The apparatus of claim 1, wherein the processor uses a chemometric equation for estimating the property.

3. canceled (previously presented) The downhole tool of claim 2, wherein the processor applies the resonator response to the chemometric equation to determine the property.

4. (previously presented) The apparatus of claim 1 wherein the processor uses a function for deriving a chemometric equation from measured resonator response correlated with known fluid property values.

5. (previously presented) The apparatus of claim 1, wherein the property is viscosity.

6. (previously presented)The apparatus of claim 1, wherein the property is density.

7. (previously presented)The apparatus of claim 1, wherein the property is dielectric constant.

8. (previously presented)The apparatus of claim 1, wherein the property is resistivity.

9. (previously presented)The apparatus of claim 2,~~:~~ wherein the processor applies the chemometric estimated property to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

10. (original) The downhole tool of claim 10, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

11. (currently amended) A method for determining a property of a fluid downhole comprising:

interacting ~~with~~ a downhole fluid with a resonator

actuating the resonator;

receiving a response from the resonator to the actuation of the resonator; and

estimating a value of the property of the fluid downhole based on the resonator response.

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12. (previously presented)The method of claim 11, further comprising:
estimating the fluid property using a chemometric equation.

13. canceled (previously presented) The method of claim 11, further comprising:
applying the resonator response to a chemometric equation to determine the property.

14. (original) The method of claim 11, further comprising:
deriving a chemometric equation from measured resonator response correlated with known fluid property values.

15. (previously presented)The method of claim 11, wherein the property is viscosity.

16. (previously presented)The method of claim 11, wherein the property is density.

17. (previously presented)The method of claim 11, wherein the property is dielectric constant.

18. (previously presented)The method of claim 11, wherein the property is resistivity

19. (previously presented)The method of claim 12, further comprising:

applying the chemometric estimated parameter value to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

20. (previously presented)The method of claim 19, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

21-30 (cancelled)

31. (currently amended) A system for determining the properties of a fluid comprising:
a surface controller which lowers a tool deployed in a well bore formed in an adjacent formation, the tool interacting with a down hole fluid;
a resonator associated with the down whole fluid;
a controller for actuating the resonator;
~~a monitor for receiving a response from the resonator to the actuation of the resonator such that the response is associated with the fluid;~~ and
a processor ~~for estimating~~ which estimates a value of a property for the down ~~whole~~ hole fluid.

32. (currently amended) The system of claim ~~1~~ 31, ~~further comprising~~:
wherein the processor uses a chemometric equation for estimating a fluid the property value.

33. (currently amended) The system of claim ~~12~~ 32, ~~further comprising:~~ wherein the processor applies a function applying the resonator response to a the chemometric equation to determine a the fluid property value.

34. (currently amended) The system of claim ~~1~~ 31, ~~further comprising:~~ wherein the processor uses a function for deriving a chemometric equation from measured resonator response correlated with known fluid property values.

35. (currently amended) The system of claim ~~1~~ 31, wherein the parameter value property is viscosity.

36. (currently amended) The system of claim ~~1~~ 31, wherein the parameter value property is density.

37. (currently amended) The system of claim ~~1~~ 31, wherein the parameter value property is dielecuic constant.

38. (currently amended) The system ~~apparatus~~ of claim ~~1~~ 31, wherein the parameter value property is resistivity.

39. (currently amended) The system of claim 12, ~~further comprising:~~

wherein the processor ~~applying~~ applies the chemometric estimated parameter value property to a Levenberg-Marquardt (LM) algorithm to determine a fluid parameter value for the fluid.

40. (currently amended) The system of claim ~~10~~ 39, wherein the fluid parameter value comprises a global minimum for the LM algorithm.

41. (new) The apparatus of claim 1 wherein the resonator comprises a mechanical resonator.

42. (new) The apparatus of claim 1 wherein the resonator comprises a tuning fork.